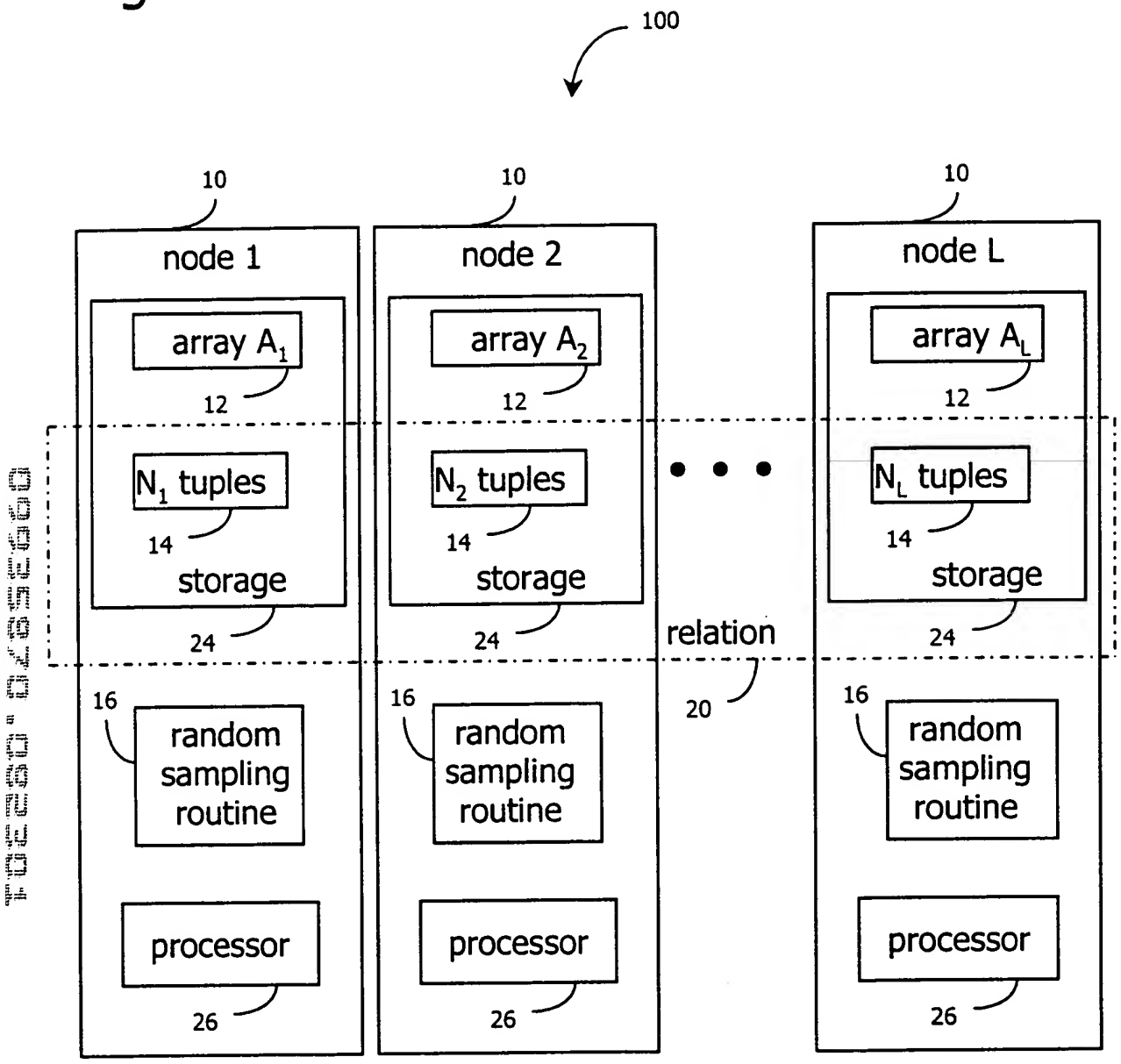
Figure 1


100
10
node 1
array A_1
12
N_1 tuples
14
storage
24
16
random sampling routine
processor
26
10
node 2
array A_2
12
N_2 tuples
14
storage
24
16
random sampling routine
processor
26
relation
20
10
node L
array A_L
12
N_L tuples
14
storage
24
16
random sampling routine
processor
26

6

Figure 2

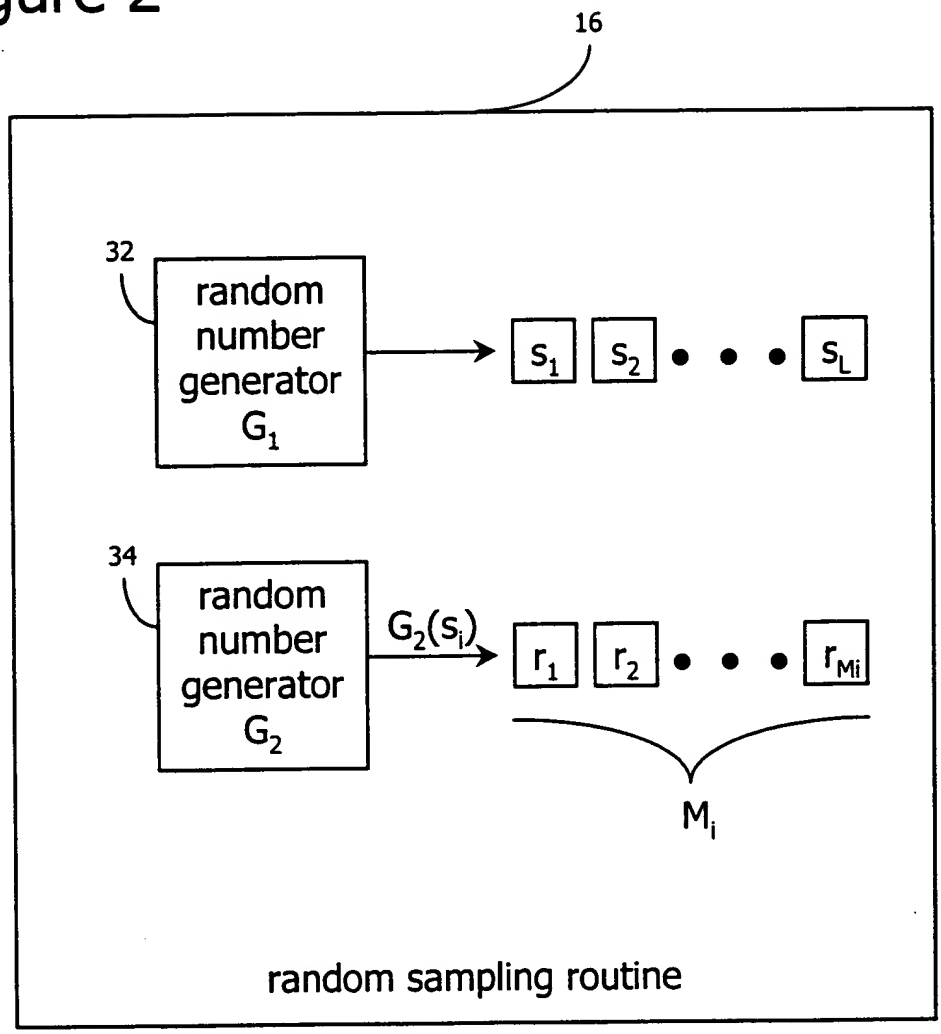

16
32
random number generator G_1
s_1 s_2 • • • s_L
34
random number generator G_2
$G_2(s_i)$
r_1 r_2 • • • r_{Mi}
M_i
random sampling routine

Figure 3

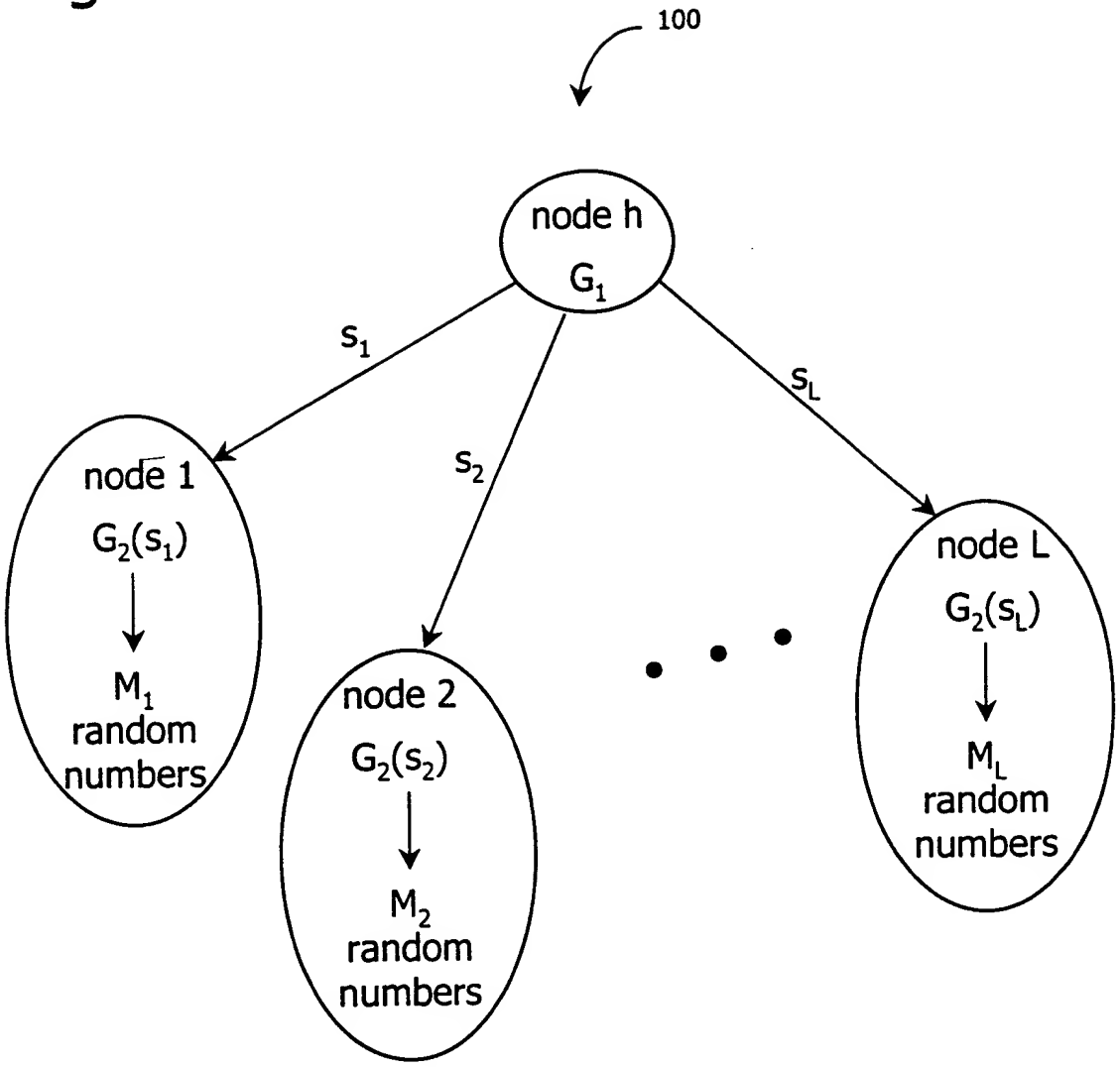

100
node h
G_1
s_1
s_2
s_L
node 1
$G_2(s_1)$
M_1 random numbers
node 2
$G_2(s_2)$
M_2 random numbers
node L
$G_2(s_L)$
M_L random numbers

Figure 4

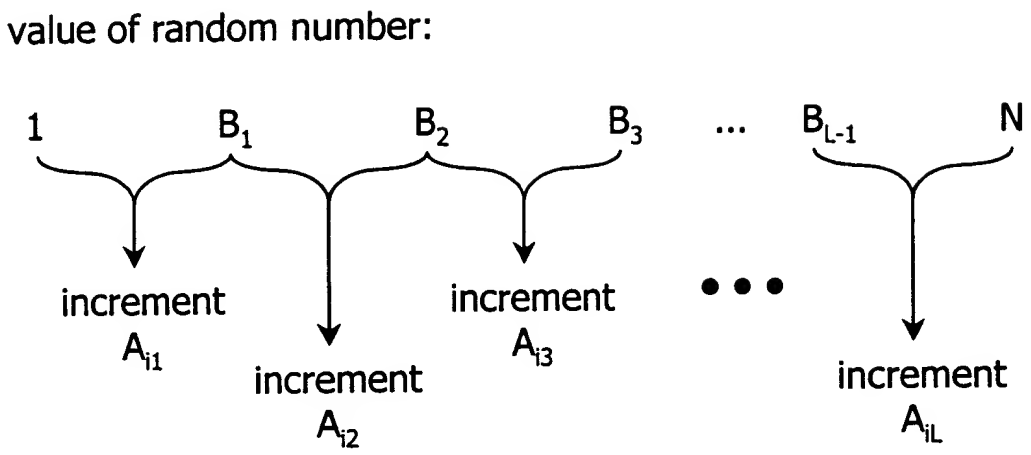

value of random number:
1
B_1
B_2
B_3
...
B_{L-1}
N
increment A_{i1}
increment A_{i2}
increment A_{i3}
increment A_{iL}

Figure 5

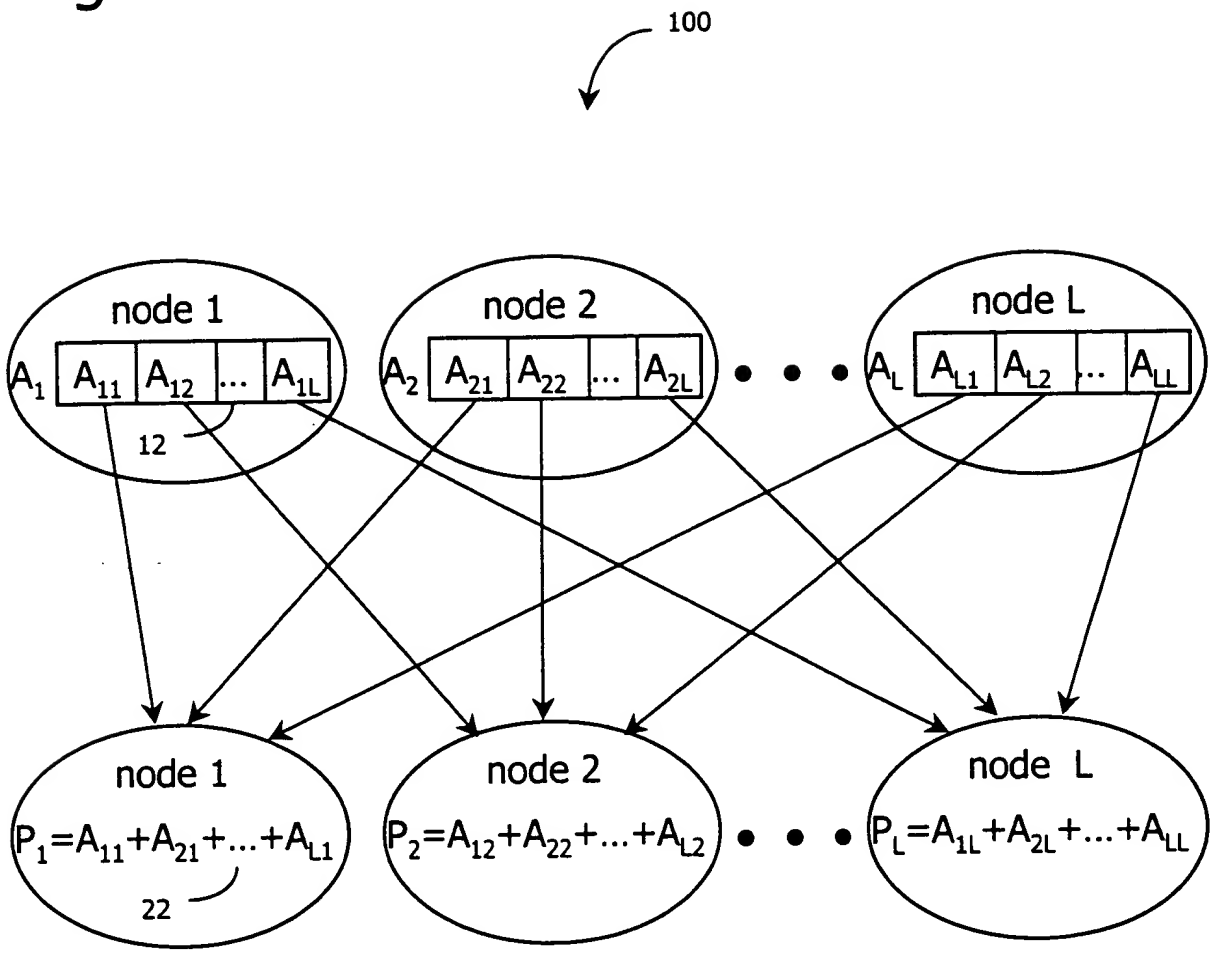
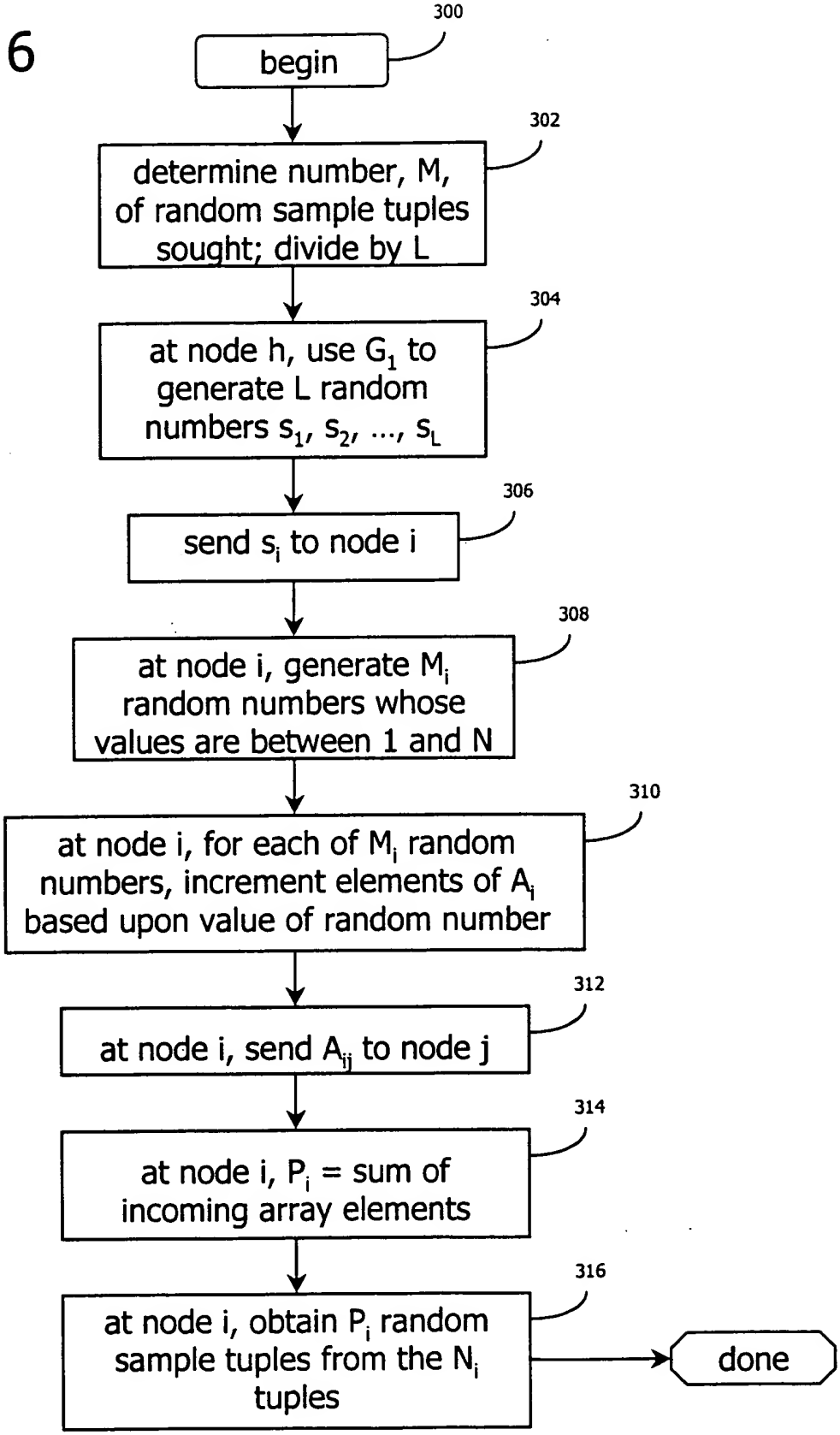

100
node 1
node 2
node L
A1
A11
A12
...
A1L
A2
A21
A22
...
A2L
AL
AL1
AL2
...
ALL
12
node 1
P1=A11+A21+...+AL1
node 2
P2=A12+A22+...+AL2
node L
PL=A1L+A2L+...+ALL
22

Figure 6


300
begin
302
determine number, M, of random sample tuples sought; divide by L
304
at node h, use G_1 to generate L random numbers $s_1, s_2, \ldots, s_L$
306
send s_i to node i
308
at node i, generate M_i random numbers whose values are between 1 and N
310
at node i, for each of M_i random numbers, increment elements of A_i based upon value of random number
312
at node i, send A_{ij} to node j
314
at node i, P_i = sum of incoming array elements
316
at node i, obtain P_i random sample tuples from the N_i tuples
done